MITSUBISHI MOTORS
TECHNICAL INFORMATION

TECHNICAL SERVICE BULLETIN

SUBJECT:	No:	TSB–06–42A–002
ECLIPSE SPYDER CONVERTIBLE TOP HYDRAULIC SYSTEM DIAGNOSIS	DATE:	**March, 2006**
	MODEL:	**2007 Eclipse Spyder**

CIRCULATE TO:	[ ] GENERAL MANAGER	[X] PARTS MANAGER	[X] TECHNICIAN
[X] SERVICE ADVISOR	[X] SERVICE MANAGER	[X] WARRANTY PROCESSOR	[ ] SALES MANAGER

PURPOSE

The 2007 Eclipse Spyder convertible top has a hydraulic control system. This bulletin describes basic diagnosis procedures for this system, which are not included in the service manual. If a convertible top is inoperative, follow the diagnosis procedures in this TSB. For more detailed convertible top diagnostic and repair information, attend the “070 Spyder New Model” training class.

AFFECTED VEHICLES

2007 Eclipse Spyder

HYDRAULIC SYSTEM OPERATION

The convertible top is operated by hydraulic pressure. A hydraulic pump pressurizes lines carrying hydraulic fluid that operate the cylinders. Hydraulic fluid flow moves a piston inside each cylinder, to extend or retract it. The cylinder movement raises or lowers a section of the top or the tonneau cover.

The hydraulic system consists of an ECU, pump valve assembly (containing five solenoid valves and a pump motor), eight hydraulic cylinders, and hydraulic lines.

The hydraulic cylinders’ functions are:

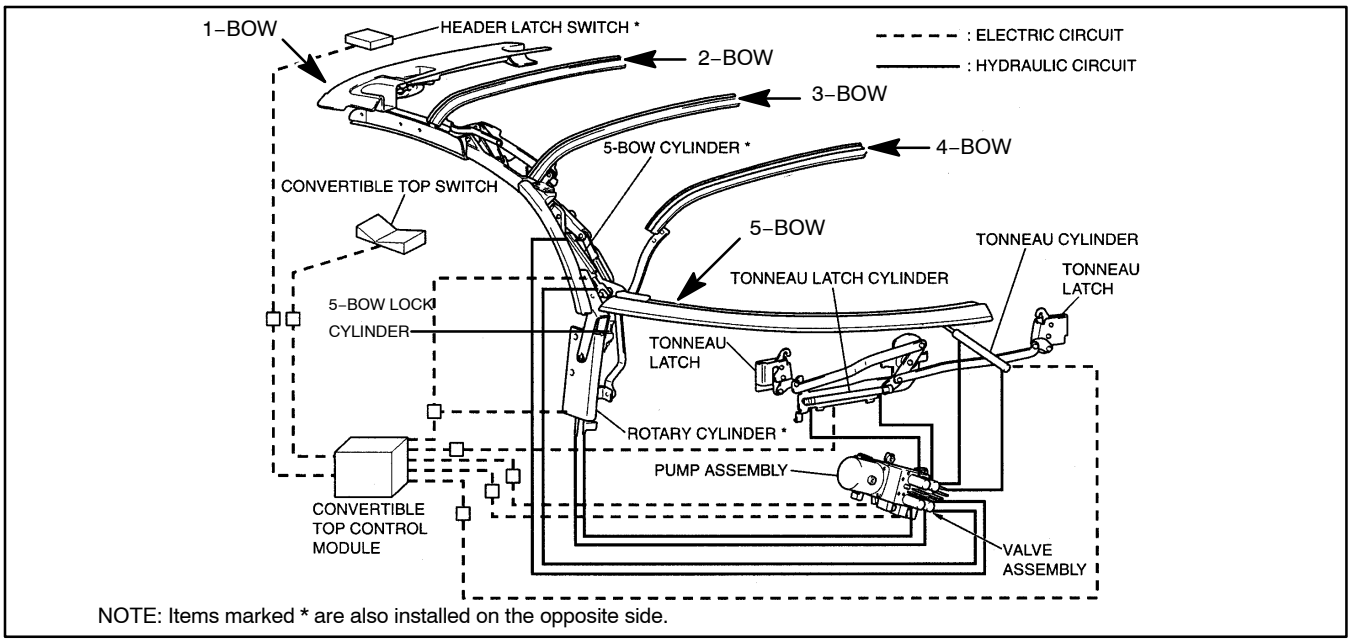
Cylinder (Quantity)	**Function**
#5 Bow Cylinder (2)	Raises/Lowers the #5 bow
#5 Bow Locking Cylinder (2)	Raises/Locks the #5 bow in the upright position
Tonneau Latch Cylinder (1)	Locks/Unlocks the tonneau latch
Tonneau Cylinder (1)	Lifts the tonneau cover up/down
Main Rotary Cylinder (2)	Rotates the top forward/backward

The ignition key must be ON in order to operate the convertible top. If top operation is interrupted by releasing the OPEN or CLOSE switch, the top will remain at its stopped position for about four minutes. Then the hydraulic system ECU will time out, hydraulic pressure will be relieved, and the hydraulic solenoids will lower the top.

If the ignition switch is turned to OFF during top operation, the oil pressure in the system is relieved and the top drops to its open or closed position.

FILE UNDER:

Group 42A Body in the Dealer Service Information Binder (3000)



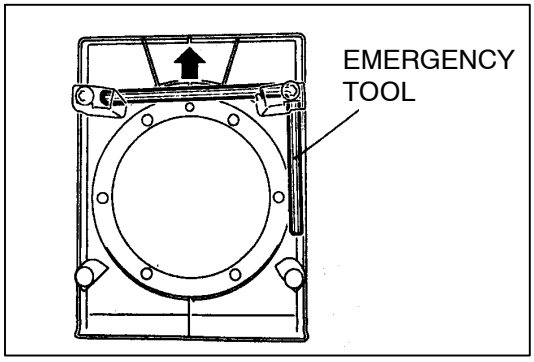
NOTE: Items marked * are also installed on the opposite side.

HYDRAULIC SYSTEM DIAGNOSIS

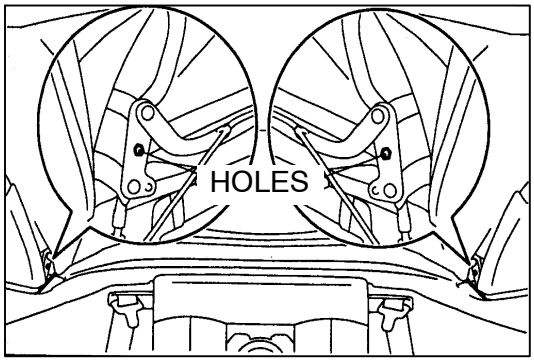
1. Verify the customer's concern.

   a. If the convertible top is already open, go to Step 2.

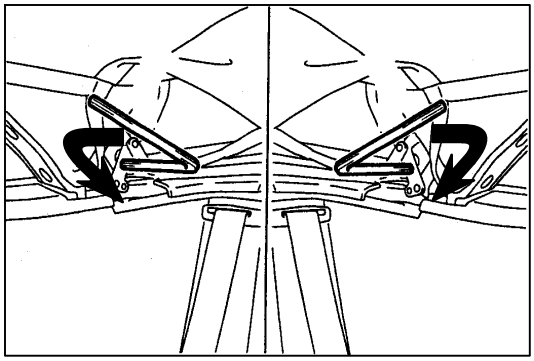
   b. If the customer has manually closed the convertible top, the manual valve is open. Close the manual valve as follows:



(1) Remove the woofer cover in the center of the rear seat. Remove the emergency tool mounted behind the woofer cover.

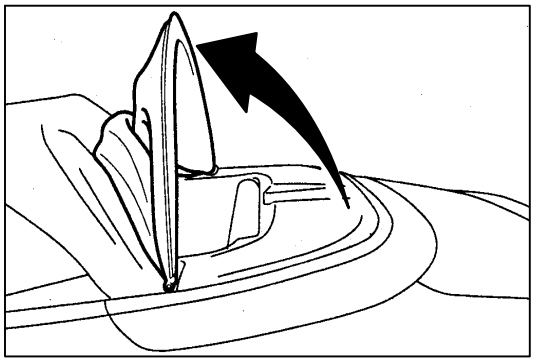


(2) Lift up the cover on each side. Locate the holes on each side where you will insert the emergency tool.

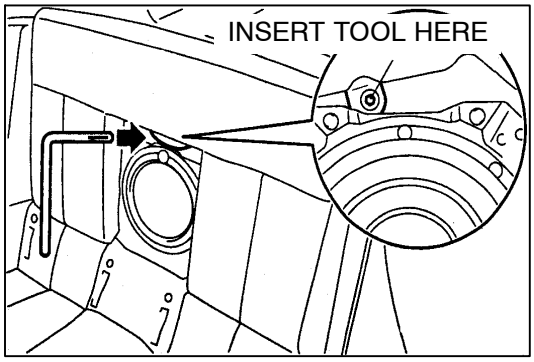


(3) Insert the stamped end of the emergency tool into the hole and push the tool downward.

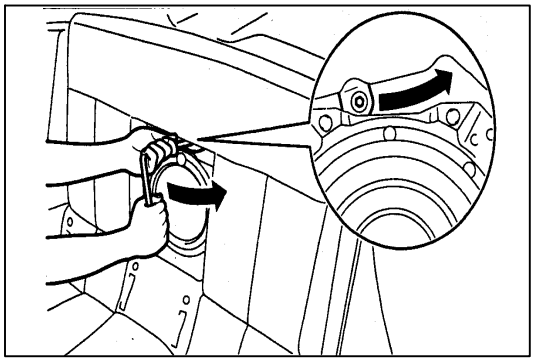
Repeat for both sides.



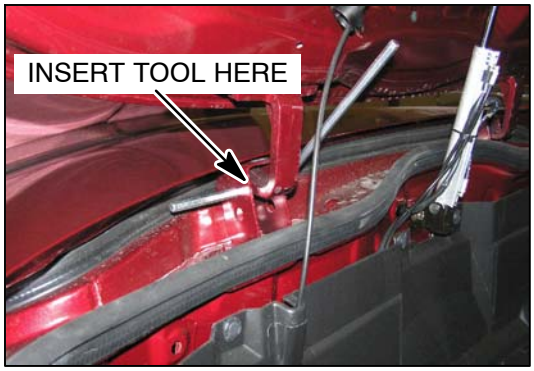
(4) Raise the #5 bow.



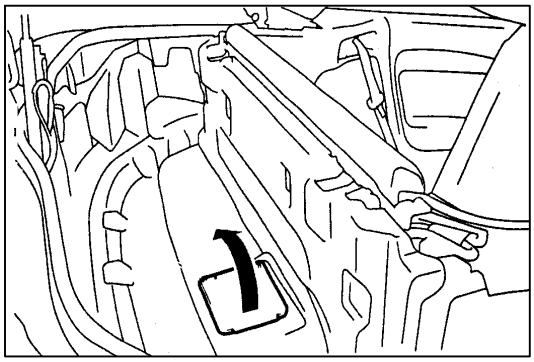
(5) Insert the stamped end of the emergency tool into the hex hole as shown.



(6) Slowly move the emergency tool in the direction of the arrow to unlock the tonneau panel.

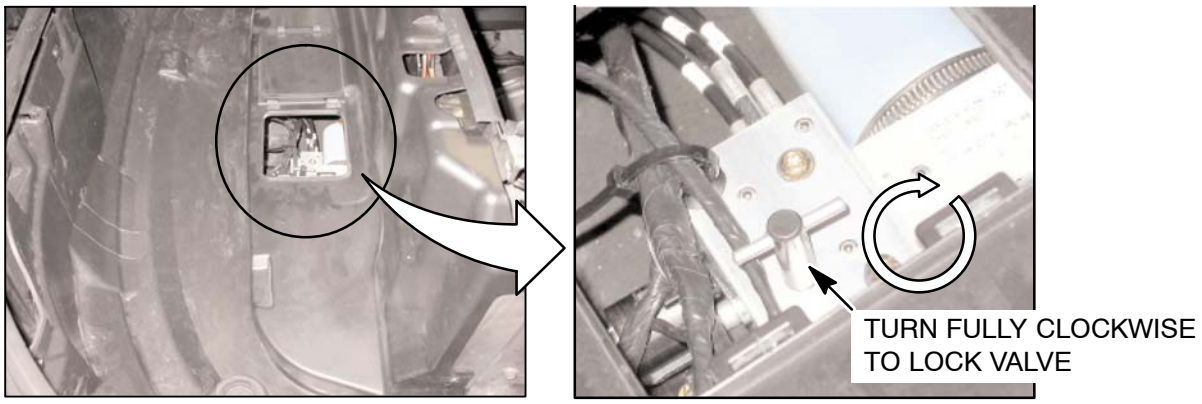


(7) Open the tonneau cover. To hold the tonneau panel in place, insert the non–stamped end of the tool into the hinge as shown. Be sure the tool is positioned upward as shown to prevent interference and possible damage.



(8) Open the cover to access the manual valve.

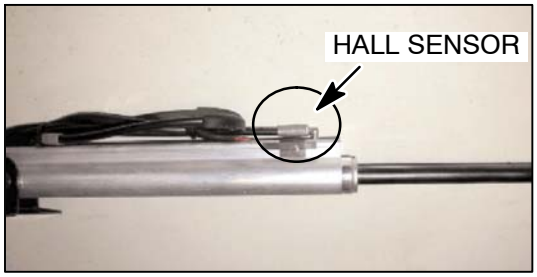
(9) Check the position of the manual valve. (If the manual valve is not closed, top operation will be slow or disabled.) If the valve is open, close the valve and retry convertible top operation. If the top now operates properly, do not continue with this bulletin diagnosis procedure.



2. Connect the MUT–III to check for any DTCs.

   a. Note the set DTCs. After clearing the DTCs, attempt to operate the top.

   b. If one or more convertible top DTCs are set (DTC B1301 – 1340 or DTC U1073), refer to pages 42–143 through 42–258 in the 2007 Eclipse Spyder service manual for the appropriate DTC diagnosis.



The hall sensors on the hydraulic cylinders identify the position of the piston in the #5 bow cylinders and #5 bow locking cylinders, the tonneau latch cylinder, and the tonneau cylinder.

The following conditions may set a DTC:

- Check for any damage to the hall sensors or their wires. Repair or replace as necessary.
- If any metallic debris is present on a hall sensor, remove the debris, then retry top operation.

   c. If no convertible top DTCs are set, continue with Step 3.

3. Visually inspect the convertible top as follows:

   a. Operate the convertible top. If it does not operate, open it manually. Refer to pages 42–261 through 42–263 in the 2007 Eclipse Spyder service manual for instructions on manually operating the convertible top.

   NOTE: If there is an internal leak in the hydraulic system, it may not be evident during manual top operation.

   c. Check for any bent linkage or damaged hinges. Replace damaged components as necessary.

   d. Check for any kinked hydraulic lines. Replace damaged lines as necessary.

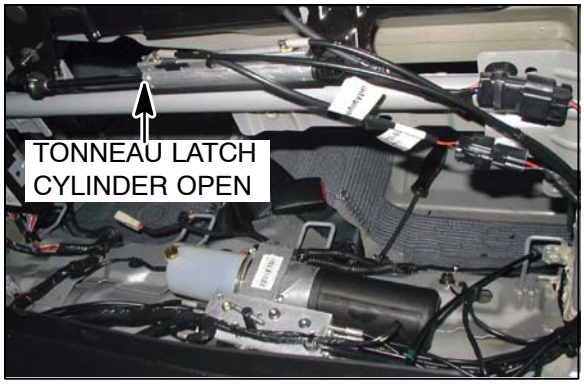
   e. Inspect for hydraulic fluid leakage at the system lines and components. If any leakage is evident, replace any leaking components.

4. If the hydraulic pump is operational, listen to the sound of the hydraulic pump while the open or close switch is pressed. If necessary, listen to a known good system on another vehicle to compare the sound of the hydraulic pump operation.

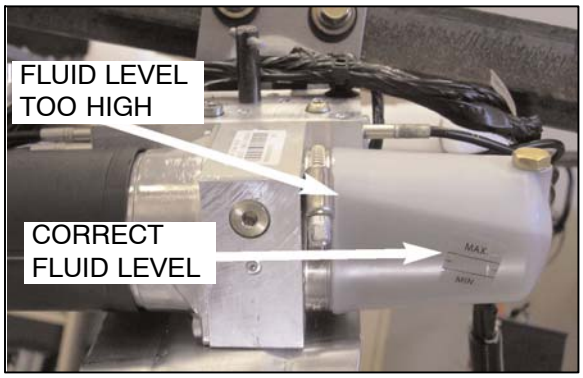
   If the pump operates with an excessively high–pitched noise, there may be a hydraulic leak. If the pump operates with an excessively low–pitched noise, there may be a restriction in a hydraulic line. Note the sound of the pump operation, then continue with Step 5.

   - Check the movement of the hydraulic cylinders. If any hydraulic cylinder does not fully extend or retract, possible causes are cylinder leakage, an external hydraulic leak, a hydraulic line restriction, or mechanical binding. Replace the affected component(s).

5. Check the hydraulic fluid level as follows:



a. Lift the # 5 bow and the tonneau cover as described in Step 1b. Be sure the tonneau latch cylinder is in the open (extended) position.



b. Remove the stowage well liner and foam cover. Check the hydraulic fluid level in the reservoir. The hydraulic fluid should be between the MAX and MIN marks.

Drain or replenish the hydraulic fluid (p/n 6559A074) as necessary to achieve proper fluid level.

⚠ CAUTION
Use only **Hydraulic Fluid part number 6559A074**. If a different hydraulic fluid is used, damage may result.

6. To continue hydraulic system diagnosis, the convertible top control module may need to re–establish the convertible top position. To do this, the system must be reset as follows:

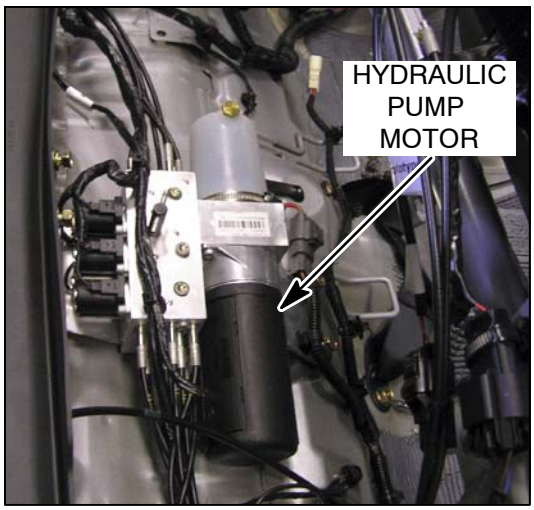
   a. Turn the ignition key to OFF.

   b. Manually open the convertible top to the fully open position. Refer to Group 42 in the 2007 Eclipse Spyder service manual, or refer to the owner's manual for instructions on manually operating the convertible top.

   c. Close the tonneau and manually lock the tonneau latch.

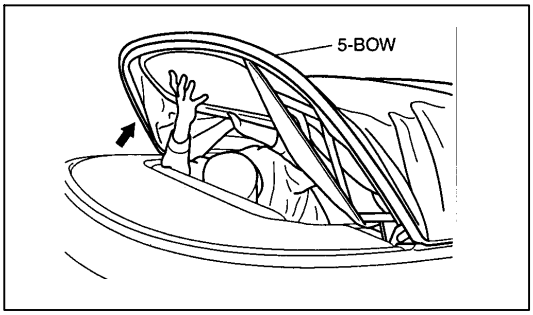
   d. Turn the ignition key to ON.

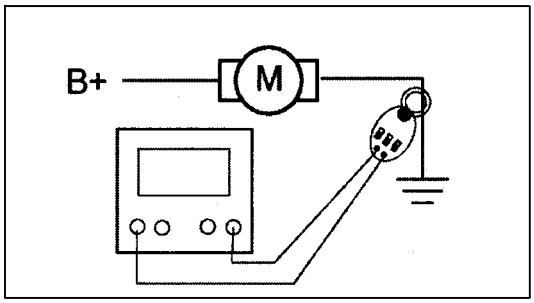
   e. Close all doors and windows.



7. Check the hydraulic pump motor operation as follows:

   a. Open the #5 bow and open the tonneau cover as described in Step 1.





   b. Install an inductive clamp on ammeter. Connect the clamp to the **ground wire of the motor.**

   c. Operate the convertible top and **observe the amp reading** on the meter as the top is opened and closed.

   d. The amperage should **peak at approximately 24 – 33 amps** during top operation.

   e. If the amperage peak is **lower than 24 amps**, install ChassisEars at the hydraulic lines at each cylinder, one at a time. Listen for an aeration sound that indicates hydraulic fluid bypassing a seal in a cylinder. Replace the affected cylinder.

      - If an aeration sound is heard, replace the affected cylinder. (If leakage is determined at a #5 bow cylinder, #5 bow locking cylinder, or main rotary cylinder, replace the affected cylinders on both sides.)
      - If NO aeration sound is heard, replace the hydraulic pump.

   f. If the amperage peak is **higher than 33 amps**, first confirm that there are no kinks in the hydraulic lines. If not, there is an internal pump failure. Replace the hydraulic pump.

8. Verify proper convertible top operation.

PARTS INFORMATION

Description	Part Number
Hydraulic Fluid	6559A074

Tech Line must review and approve before replacement of the following major convertible top components:

- **Top Cover Assembly**
- **Hydraulic Pump**
- **Convertible Top ECU (control module)**
- **Convertible Top Assembly – Also requires DPSM inspection prior to replacement**
- **Complete Hydraulic System – Also requires DPSM inspection prior to replacement**

WARRANTY INFORMATION

Convertible Top Warranty Coverage: 5 years / 60,000 miles whichever occurs first

Tech Line must review and approve before replacement of the following major convertible top components:

- **Top Cover Assembly**
- **Hydraulic Pump**
- **Convertible Top ECU (control module)**
- **Convertible Top Assembly – Also requires DPSM inspection prior to replacement**
- **Complete Hydraulic System – Also requires DPSM inspection prior to replacement**

Labor operations relating to the 2007 Eclipse Spyder convertible top are found in Labor Operation Bulletin **LB 2007–001**, which has been sent to all dealers and is also available in Warranty Central on the Mitsubishi Dealer Link.

The information contained in this bulletin is subject to change. For the latest version of this document, go to the Mitsubishi Dealer Link, MEDIC, or the Mitsubishi Service Information website *(www.mitsubishitechinfo.com)*.